# Total-Step and Successive Overrelaxation Methods for LCP-Problems with Interval Data

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Let there be given an $(n,n)$ matrix $M$ and a vector $q \in \mathbb{R}^n$. The linear complementarity problem (LCP-problem) consists in finding a vector $x^* \geq 0$ such that

$$Mx^* + q \geq 0 \quad \text{and} \quad x^{*T}(Mx^* + q) = 0, \qquad \text{(LCP)}$$

or to show that no such vector exists. This problem has many applications; see [1] and [2], for example.

In this talk, we are starting with an $(n,n)$ interval matrix $[M]$ and an interval vector $[q]$ with $n$ components. Using the total-step method and the successive overrelaxation method, respectively, we compute interval vectors $[x^k]$ which (under certain conditions on $[M]$ and $[x^0]$) contain the solutions of (LCP) for all $M \in [M]$ and all $q \in [q]$. Furthermore the convergence of $\{[x^k]\}$ to some limit $[x^*]$ is shown. Applications to this problem can be found in [3]. Some numerical examples are given.

## References

[1] R. Cottle, J.-S. Pang, and R. E. Stone, *The Linear Complementarity Problem*, Academic Press, 1992.

[2] K. G. Marty, *Linear Complementarity, Linear and Nonlinear Programming*, Heldermann Verlag, Berlin, 1988.

[3] U. Schäfer, *Das lineare Komplementaritätsproblem mit Intervalleintrgen*, Ph.D. Thesis, Fakultät fr Mathematik, Universität Karlsruhe, 1999.